53 (EC 301) ELDC

2017

ELECTRONIC DEVICE & CIRCUITS

Paper : EC 301

Full Marks : 100

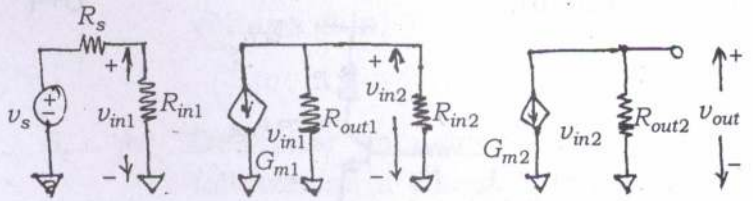
Time : Three hours

The figures in the margin indicate full marks for the questions.

*Answer **any five** questions.*

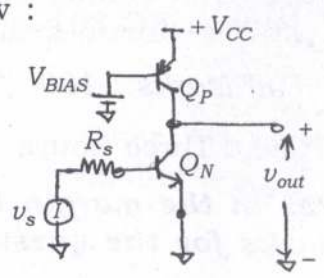
1. *(a)* Describe the operation of a series regulator with the help of proper circuit diagram. 6

   (b) Calculate the open circuit voltage gain of the following amplifier circuit. 4



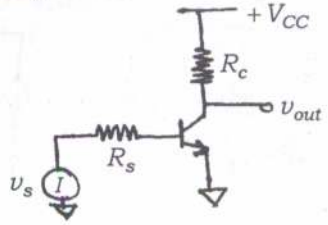
(c) Describe operation of a common collector amplifier circuit as an emitter follower. 10

2. (a) Derive the expression for open circuit voltage gain, Input resistance, output resistance for the Amplifier shown below : 10



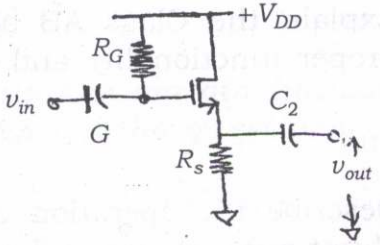
(b) Why Boost-regulators are necessary in electronics ? Describe the operation with proper circuit diagram to derive the expression for duty cycle. 2+8

3. (a) Derive the expression for open circuit voltage gain ϕ–3dB frequency of the amplifier circuit shown below in HF domain. 6+4



(b) Describe the operation of online UPS in different modes and compare its performance with offline UPS. 8+2

4. (a) Shown below is a circuit diagram of an amplifier, Mention the type of amplifier and derive the expressions for open circuit voltage gain, input resistance and O/P resistance. 1+3+3+3



(b) Write a short note on short-circuit protection technique for voltage regulators. 5

(c) Mention the types of multi-stage amplifiers and draw the model for 2-stage amplifier and derive the overall voltage gain. 5

5. (a) Describe the operation of Emitter follower as a Class A amplifier, derive the efficiency. 10

(b) Describe the function of Buck regulator with proper circuit diagram and mention the expression for Duty cycle. 10

6. (a) Draw the circuit diagram of single tuned and double tuned amplifier and explain their frequency response. 10

(b) Explain the Class AB amplifier with proper functionality and efficiency. 10

7. (a) Describe the operation of series and shunt-regulator using Zener diode with circuit diagram. 5+5

(b) Describe the features of CE-CE cascoded amplifier with its circuit diagram. 5

(c) Why thermal protection is necessary in voltage regulators ? How it can be managed ? 5